

REMARKS

Claims 1-10 have been rejected under 35 USC 103(a) as being unpatentable over Takei et al in view of Kumagai et al '181. Claims 1-3 and 5-9 have been rejected under 35 USC 103(a) as being unpatentable over Takei et al in view of Kumagai '094. Claims 1-3 and 5-9 have been rejected under 35 USC 103(a) as being unpatentable over Takei et al in view of Kumagai '093. Claims 1-9 have been rejected under 35 USC 103(a) as being unpatentable over Takei et al in view of Kumagai et al '482. Claims 1-3 and 5-9 have been rejected under 35 USC 103(a) as being unpatentable over Takei et al in view of Tsuchida et al. Applicants respectfully traverse these grounds of rejection and urge reconsideration in light of the following comments.

As explained previously, the instant invention is directed to a resin composition which contains the following components as essential components, (A) a polyol, (B) a polyisocyanate and (C) a silane coupling agent containing an imidazole group. The ratio NCO/OH of the number of isocyanate groups in the polyisocyanate (B) to the number of hydroxyl groups in the polyol (A) in the composition is from 0.6 to 4.0 and the weight ratio of [(A)+(B)]:(C) is from 100:0.01 to 100:10.

As discussed previously, the present invention has been arrived at in order to avoid the side-effects associated when using a tertiary amine compound as a catalyst with respect to them having an unpleasant odor and being highly volatile. The resin composition of the present invention avoids the problem of an unpleasant odor being produced when a tertiary amine compound is used as a catalyst in a reaction between a polyol and a polyisocyanate and provides a resin composition that promotes the curing of these resins and improves their adhesion to metals, inorganic materials and organic materials. It is respectfully submitted that the presently claimed

invention is patentably distinguishable over the prior art cited by the Examiner.

The Takei et al reference discloses polyurethanes which are formed from a hydroxyl functional polymer (A) and a polyfunctional isocyanate compound (g) wherein the molar ratio NCO/OH is preferably in the range of from 0.8 to 1.2. As admitted by the Examiner, this reference does not disclose the resin composition also comprising a silane coupling agent containing an imidazole group.

Kumagai et al has been cited by the Examiner as disclosing a resin additive formed from the reaction of an imidazole and a silane compound with a glycidoxy group. The Examiner further asserts that Kumagai et al teaches that resin additives may be used with polyurethane resins and fluoro resins in an amount of from 0.1 to 20 parts by weight per 100 parts by weight of the resin and that the motivation for adding the resin additives would be to improve the resin strength and adhesion to metals such as copper, steel or aluminum or an inorganic material.

In the outstanding Office Action, in response to Applicants argument that there is no expectation that a reaction would even occur between a polyol and a polyisocyanate in the presence of a silane coupling agent containing an imidazole group, the Examiner states that 1) the claims are not limited to a reaction mixture of a separate polyol, polyisocyanate and a silane coupling agent containing an imidazole but merely to a resin composition comprising these components, 2) Kumagai does not limit the addition of an imidazole silane coupling agent to a resin after the resin product is formed and 3) the Takei reference teaches the addition of the catalyst for the reaction of the hydroxyl functional polymer (A) and the polyfunctional isocyanate compound (g) such as tertiary amines and that imidazoles are known catalysts for urethane-forming reactions.

With respect to point 1) discussed above, it is well known in the art that the term "resin composition" is

different from the components that make up the resin composition. Components that react to form a compound are not the same as the compound per se. The currently presented claims require that the resin composition be formed from a polyol, a polyisocyanate and a silane coupling agent containing an imidazole group. As such, the currently presented language of Claim 1 precludes the addition of a silane coupling agent to a polyurethane product. The three components of Claim 1 react to form the reaction product. Therefore, since Kumagai et al only discloses the imidazole/organic monocarboxylic acid salt derivative reaction product as an additive to a non-epoxy resin and not as a component of the resin, Applicants respectfully submit that the Examiner's reading of Kumagai et al clearly is in error.

With respect to point 2) above, although Kumagai et al discloses in column 9, lines 56-59, that the imidazole silane coupling agent can be used as a curing agent for a resin in which it will improve the adhesive strength and mechanical strength of the resin, there is no suggestion that the resin disclosed there includes a resin composition which reacts to form urethane. In fact, the entire disclosure of Kumagai et al indicates that the "resin" disclosed there is an epoxy resin. That is, column 1, lines 20-24, state that there is "...for improving the adhesive strength and mechanical strength of a resin such as an epoxy resin, and a resin composition ...", and all of the Examples in this reference disclose the use of epoxy resins only, with no urethane-forming resin compositions being shown. As such, the Kumagai et al reference does not disclose that a silane coupling agent containing an imidazole group could actually improve the adhesive strength and mechanical strength of the polyurethane resin when used together with a polyol and a polyisocyanate to react to form the resin composition.

With respect to point 3) raised above, while it is true that imidazoles are known catalysts for urethane-forming reactions, objective evidence is provided in the present

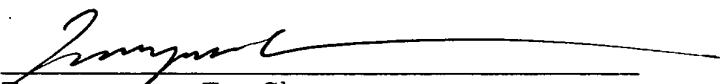
specification of the contribution of the imidazole group-containing silane coupling agent to the increased adhesion to the base material. That is, imidazole silane A in Example 3 and imidazole silane B in Example 4 are shown to produce excellent adhesive results as compared to an imidazole compound of conventional catalysts in Comparative Example 8. Moreover, imidazole silane A in Example 3 and imidazole silane B in Example 4 show a better adhesiveness compared with general silane coupling agents of Comparative Example 5-7. This provides objective evidence that the imidazole group-containing silane coupling agent of the present invention is superior to conventional imidazole compounds and is completely unexpected in light of the prior art cited by the Examiner. That is, there is no teaching, disclosure or suggestion in the prior art that the imidazole group-containing silane coupling agent of the present invention when used together with a polyol and a polyisocyanate as a resin composition according to the specific requirements of the currently claimed invention would provide a resin composition having better adhesive results than conventional silane coupling agents.

Additional objective evidence of the unobviousness of the presently claimed invention is also found in the "salt water spray test" where imidazole silane A of Example 5 and imidazole silane B of Example 6 show a longer duration until the appearance of white rust after being subjected to a salt water spray test than the conventional silane compounds of Comparative Examples 12 and 13. That is, the use of the resin composition of the present invention results in an improved corrosion resistance effect which is not suggested or taught in any of the prior art references cited by the Examiner and this improved corrosion resistance effect is an unexpected result caused by the synergistic effect between the three components of the present invention. As such, it is respectfully submitted that the presently claimed invention clearly is patentably distinguishable over Takei et al in combination with Kumagai '181.

The remaining secondary references cited by the Examiner are all cumulative to Kumagai et al '181. That is, Kumagai '094, Kumagai '093, Kumagai '482 and the Tsuchida et al reference all merely disclose the addition of a resin additive to a resin, like the previously discussed Kumagai et al reference. These secondary references do not show the addition of the resin additive to the components that make up the polyurethane resin or suggest that any benefit would be gained thereby. As pointed out previously, in fact, there is no expectation or reason to believe that the reaction would even occur between the polyol and the polyisocyanate in the presence of a silane coupling agent containing an imidazole group based on the disclosures of the secondary references cited by the Examiner. As such, the patentability of the presently claimed invention clearly has been established over the prior art cited by the Examiner.

Reconsideration of the present application and the passing of it to issue is respectfully solicited.

Respectfully submitted,

  
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